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मानक

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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 5522 (1992): Stainless steel sheets and strips for utensils [MTD 16: Alloy Steels and Forgings]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

बर्तनों के लिए स्टेनलैस इस्पात चद्दरें और पत्तियाँ — विशिष्ट
(दूसरा पुनरीक्षण)

Indian Standard

STAINLESS STEEL SHEETS AND STRIPS FOR
UTENSILS — SPECIFICATION

(*Second Revision*)

First Reprint OCTOBER 1996

UDC 669.14.018.8.41

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NEW DELHI 110002

July 1992

Price Group 2

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Alloy Steels and Special Steels Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1969 and revised in 1978. The following major modifications have been incorporated in this revision.

A survey of overseas standards available for stainless steel utensils showed that only stainless steel conforming to AISI 300 grade series (18/8 type) has been prescribed for manufacture of utensils. Metallurgical Engineering Division Council (MTDC) of BIS, in its recent meeting had examined the issue and decided that only stainless steel of 18/8 type be permitted for household utensils. Accordingly only two grades have been covered.

While finalizing revision of this Indian Standard it was decided by the committee that the test data for low nickel manganese, copper grades of stainless steels and the ferritic stainless steels will be examined by the committee as and when available for incorporation in the Indian Standard.

Steel designations presently specified were posing difficulty in implementation of the standards on stainless steels. It has therefore been felt to specify grade designation aligned with AISI system of designation for ease of remembrance and better implementation.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

STAINLESS STEEL SHEETS AND STRIPS FOR UTENSILS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard covers the requirements for stainless steel in the form of sheets and strips for manufacture of utensils.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
228	Methods for chemical analysis of steels (Issued in various parts)
1387 : 1967	General requirements for the supply of metallurgical materials (<i>first revision</i>)
1500 : 1983	Method for Brinell hardness test for metallic materials (<i>second revision</i>)
1501 (Part 1) : 1984	Method for Vickers hardness test for metallic materials: Part 1 HV 5 to HV 100 (<i>second revision</i>)
1586 : 1988	Method for rockwell hardness test for metallic material (Scales A-B-C-D-E-F-G-H-K) (<i>second revision</i>)
1608 : 1972	Method for tensile testing of steel products (<i>first revision</i>)
1663 : 1972	Method for tensile testing of steel sheet and strip of thickness 0.5 mm to 3 mm (<i>first revision</i>)
1762 (Part 1) : 1974	Code for designation of steels: Part 1 Based on letter symbols (<i>first revision</i>)
1956 (Part 4) : 1975	Glossary of terms relating to iron and steel: Part 4 Steel sheet and strip
10175 : 1982	Modified Erichsen cupping test for metallic sheet and strip

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 1956 (Part 4) : 1975 shall apply.

4 SUPPLY OF MATERIAL

4.1 General requirements relating to the supply of material shall conform to IS 1387 : 1967.

5 MANUFACTURE

5.1 Unless otherwise agreed to in the order, the processes used in making the steel shall be left to the discretion of the manufacturer. However, the steel shall be fully killed. When so desired, the purchaser shall be informed of the steel making process.

5.1.1 Sufficient discard shall be made to ensure freedom from pipe and harmful segregations.

6 FREEDOM FROM DEFECTS

6.1 Stainless steel sheets and strips shall be free from harmful defects, such as scale, rust, blisters, laminations, cracked edges and seams.

NOTE — When coil is supplied, the degree or amount of surface defects may be expected to be more than in cut lengths because of the impossibility of rejecting portions of the coils. This should be taken into account by the purchaser in his assessment of coils.

7 CHEMICAL COMPOSITION

7.1 Ladle analysis of the two grades of sheets and strips shall be as given in Table 1. The analysis of steel shall be carried out according to IS 228 and its relevant parts.

7.1.1 Check Analysis

In case of check analysis, the permissible variation for the limits specified in Table 1 shall be as given in Table 2.

8 PHYSICAL TESTS

8.1 Tensile Test

Test samples shall be cut in such a manner that deformation is avoided as far as possible.

8.2 When tested in accordance with IS 1663 : 1972 or IS 1608 : 1972, the tensile strength, proof stress and percentage elongation shall be as given in Table 3.

Table 1 Chemical Composition
(Clause 7.1)

Grade Designation		Constituents, Percent						
Letter Symbol [see IS 1762 (Part 1) : 1974]	Numerical Symbol	Carbon <i>Max</i>	Silicon <i>Max</i>	Manganese <i>Max</i>	Nickel	Chromium	Sulphur <i>Max</i>	Phosphorus <i>Max</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ISS							
X04Cr19Ni9	304	0.08	1.0	2.0	8.0 to 10.5	17.5 to 20.0	0.030	0.045
X07Cr18Ni9	302	0.12	1.0	2.0	8.0 to 10.0	17.0 to 19.0	0.030	0.045

Table 2 Permissible Variation Between Specified Analysis and Check Analysis
(Clause 7.1.1)

Sl No. (1)	Element (2)	Permissible Deviation* (3)
		Percent
i)	Carbon	± 0.01
ii)	Silicon	± 0.05
iii)	Manganese	± 0.04
iv)	Nickel	± 0.10
v)	Chromium	± 0.20
vi)	Sulphur	+ 0.005
vii)	Phosphorus	+ 0.010

*In one cast the deviation may occur over the upper value or under the lower value of the specified range in Table 1.

8.3 Hardness Test

The hardness of sheets and strips when determined in accordance with IS 1500 : 1983 or IS 1501 (Part 1) : 1984 or IS 1586 : 1988 shall be as given in Table 3.

8.3.1 One test shall be made on each coil, and for every 100 sheets for each size of the same cast.

8.3.2 Any test, other than those specified in 8.1 and 8.3 may be conducted subject to mutual agreement between the purchaser and the manufacturer.

8.4 Erichsen Cupping Test

8.4.1 Subject to agreement between the purchaser and the manufacturer, one cupping test (see IS 10175 : 1982) shall be carried out from each lot of five tonnes of material or part thereof from each cast.

8.4.1.1 Where sheets of more than one thickness are rolled from the same cast, one additional cupping test shall be made for each thickness of sheet.

8.4.1.2 Cupping test shall be applicable only for sheets of drawing, deep drawing and extra deep drawing types having thickness from 0.5 mm to 1.6 mm.

8.4.2 Requirements

The minimum Erichsen values shall be as given below:

Thickness, mm		Average Depth of Cupping, mm
Over	Up to and Including	
0.20	0.80	10.0
0.80	—	12.0

Table 3 Mechanical Properties in Annealed/Softened Condition
(Clauses 8.2 and 8.3)

Grade Designation		0.2 Percent Proof Stress N/mm ² <i>Min</i>	Tensile Strength N/mm ² <i>Min</i>	Percentage Elongation <i>Min</i> GL = 50 mm	Hardness, <i>Max</i>		
Letter Symbol [see IS 1762 (Part 1) : 1974]	Numerical Symbol				Brinell HB	Rockwell HRB	Vickers Pyramid
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ISS						
X04Cr19Ni9	304	205	490	40	187	90	197
X07Cr18Ni9	302	205	490	40	187	90	197

9 DIMENSIONS

9.1 Stainless steel sheets and strips shall be supplied in the following standard dimensions:

Sheets — Sheets may be supplied in the following standard width: 600, 750, 800, 850, 900, 1 000, 1 100 and 1 200 mm.

The strip width and coil weight (sheet and strip) shall be as agreed to between the purchaser and the manufacturer.

9.2 The thickness of sheets and strips shall be 1.25, 1.10, 1.00, 0.90, 0.80, 0.70, 0.60, 0.50, 0.45, 0.40, 0.35, 0.30, 0.25 and 0.20 mm.

9.3 The length for sheets and strips shall be as agreed to between the purchaser and the manufacturer.

10 TOLERANCES

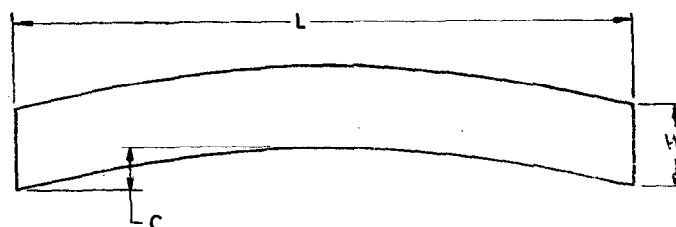
10.1 The rolling tolerances for stainless steel sheets and strips shall be as follows:

	<i>Tolerance</i>
Width	± 1.5 mm
Length	$+ 10.0$ mm $- 0$
Thickness:	
2.20 to 0.40 mm	± 0.04 mm
Over 0.40 up to and including 0.80 mm	± 0.10 mm
Over 0.80 up to and including 1.00 mm	± 0.12 mm
Over 1.00 up to and including 1.25 mm	± 0.14 mm

NOTE — Measurement of thickness shall be made at least 10 mm away from the edge of the sheet or strip.

10.2 Camber

Permissible values for camber for cold rolled steel sheets/strips shall be as given in Fig. 1.



W = WIDTH L = LENGTH C = EDGE CAMBER

Width

*Maximum Values of Camber
for 2 000 mm Length*

Less than 250

5

250 to less than 500

4

From 500 and above

2

All dimensions in millimetres.

FIG. 1 PLAN VIEW OF SHEET/STRIP SHOWING EDGE CAMBER

11 CONDITIONS OF SUPPLY

11.1 Unless specified otherwise, the sheets and strips shall be supplied to any of the following conditions:

- Hot rolled, annealed, pickled and flattened;
- Cold rolled, annealed, pickled and flattened;
- Cold rolled, annealed, pickled, flattened and skin passed;
- Rolled, annealed, pickled, surface polished with 100 grit; and
- Rolled, annealed, pickled, surface polished with 120 grit.

12 PACKING

12.1 Stainless steel sheets and strips shall be supplied in bundles or in coils as may be agreed to between the purchaser and the manufacturer. The mass of each bundle or coil shall be between 500 kg to 1 000 kg. However, higher weight bundles and coils may be supplied as agreed to between the manufacturer and the purchaser.

12.2 Sheets and strips shall be securely packed in paper and tied round with hoop iron with wooden battens underneath to prevent the sheets from damage during transit.

13 MARKING

13.1 Every bundle or package of sheets, strips and coils shall be legibly marked with paint showing the name or trade-mark of the manufacturer, mass, thickness, size, grade and the cast number or identification marks, by which the materials may be traced to the cast or casts from which they are made.

13.2 The material may also be marked with the Standard Mark. Details available with Bureau of Indian Standards.

Bureau of Indian Standards

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This Indian Standard has been developed from Doc: No. MTD 16 (3886)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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